

FORM PTO-1390 (Modified)
(REV 11-2000)

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

521.1008

097890685

TRANSMITTAL LETTER TO THE UNITED STATES

DESIGNATED/ELECTED OFFICE (DO/EO/US)

CONCERNING A FILING UNDER 35 U.S.C. 371

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR

To Be Assigned

INTERNATIONAL APPLICATION NO.

PCT/EP00/00809

INTERNATIONAL FILING DATE

February 1, 2000

PRIORITY DATE CLAIMED

February 4, 1999

TITLE OF INVENTION

CIRCUIT BREAKER AND METHOD FOR PRODUCING SAME

APPLICANT(S) FOR DO/EO/US

Guido DEDENBACH, Klaus OCHTINGER, Carsten RUSTENBERG; Lutz THILKER

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:


1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (24) indicated below.
4. ☒ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
 - a. ☒ is attached hereto (required only if not communicated by the International Bureau).
 - b. ☐ has been communicated by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
- ☒ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
 - a. ☒ is attached hereto.
 - b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
- ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
 - a. ☐ are attached hereto (required only if not communicated by the International Bureau).
 - b. ☐ have been communicated by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☒ have not been made and will not be made.
- ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
- ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
- ☒ An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).
- ☒ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
- ☒ A copy of the International Search Report (PCT/ISA/210).

Items 13 to 20 below concern document(s) or information included:

13. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☒ A **FIRST** preliminary amendment.
16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
17. ☐ A substitute specification.
18. ☐ A change of power of attorney and/or address letter.
19. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
20. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
21. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
22. ☒ Certificate of Mailing by Express Mail
23. ☒ Other items or information:

Letter re: Priority

APPLICATION NO. (IF KNOWN) SEE 37 CFR 097890685 To Be Assigned		INTERNATIONAL APPLICATION NO. PCT/EP00/00809		ATTORNEY'S DOCKET NUMBER 521.1008	
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24. The following fees are submitted:				CALCULATIONS PTO USE ONLY																																																																																			
BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) : <input type="checkbox"/> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO \$1000.00 <input checked="" type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO \$860.00 <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$710.00 <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$690.00 <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) \$100.00																																																																																							
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<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:15%;">CLAIMS</th> <th style="width:20%;">NUMBER FILED</th> <th style="width:20%;">NUMBER EXTRA</th> <th style="width:10%;">RATE</th> <th style="width:15%;"></th> <th style="width:10%;"></th> </tr> </thead> <tbody> <tr> <td>Total claims</td> <td style="text-align: center;">- 20 =</td> <td style="text-align: center;">0</td> <td style="text-align: center;">x \$18.00</td> <td></td> <td style="text-align: right;">\$0.00</td> </tr> <tr> <td>Independent claims</td> <td style="text-align: center;">- 3 =</td> <td style="text-align: center;">0</td> <td style="text-align: center;">x \$80.00</td> <td></td> <td style="text-align: right;">\$0.00</td> </tr> <tr> <td colspan="5">Multiple Dependent Claims (check if applicable). <input type="checkbox"/></td> <td style="text-align: right;">\$0.00</td> </tr> <tr> <td colspan="5" style="text-align: right;">TOTAL OF ABOVE CALCULATIONS =</td> <td style="text-align: right;">\$860.00</td> </tr> <tr> <td colspan="5" style="vertical-align: top;"> <input type="checkbox"/> Applicant claims small entity status. (See 37 CFR 1.27). The fees indicated above are reduced by 1/2. </td> <td style="text-align: right; vertical-align: bottom;">\$0.00</td> </tr> <tr> <td colspan="5" style="text-align: right;">SUBTOTAL =</td> <td style="text-align: right;">\$860.00</td> </tr> <tr> <td colspan="5" style="vertical-align: top;"> Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492 (f)). </td> <td style="text-align: right; vertical-align: bottom;">\$0.00</td> </tr> <tr> <td colspan="5" style="text-align: right;">TOTAL NATIONAL FEE =</td> <td style="text-align: right;">\$860.00</td> </tr> <tr> <td colspan="5" style="vertical-align: top;"> Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) (check if applicable). <input type="checkbox"/> </td> <td style="text-align: right; vertical-align: bottom;">\$0.00</td> </tr> <tr> <td colspan="5" style="text-align: right;">TOTAL FEES ENCLOSED =</td> <td style="text-align: right;">\$860.00</td> </tr> <tr> <td colspan="5"></td> <td style="text-align: right;"> Amount to be: refunded \$ charged \$ </td> </tr> </tbody></table> <table style="width:100%;"> <tr> <td style="width:5%;">a.</td> <td style="width:5%;"> <input checked="" type="checkbox"/> </td> <td style="width:90%;"> A check in the amount of \$860.00 to cover the above fees is enclosed. </td> </tr> <tr> <td>b.</td> <td> <input type="checkbox"/> </td> <td> Please charge my Deposit Account No. _____ in the amount of _____ to cover the above fees. A duplicate copy of this sheet is enclosed. </td> </tr> <tr> <td>c.</td> <td> <input checked="" type="checkbox"/> </td> <td> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 50-0552 A duplicate copy of this sheet is enclosed. </td> </tr> <tr> <td>d.</td> <td> <input type="checkbox"/> </td> <td> Fees are to be charged to a credit card. WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038. </td> </tr> </table> <p>NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.</p> <p>SEND ALL CORRESPONDENCE TO:</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>William C. Gehris Reg. No. 38,156 DAVIDSON, DAVIDSON & KAPPEL, LLC 485 Seventh Avenue 14th Floor New York, NY 10018</p> <div style="text-align: center;">  23280 <small>PATENT TRADEMARK OFFICE</small> </div> </div> <div style="width: 45%; border-left: 1px solid black; padding-left: 10px;"> <p style="font-size: 1.5em; margin-bottom: 0;">W.C. Gehris</p> <p>SIGNATURE</p> <p>William C. Gehris</p> <p>NAME</p> <p>38,156</p> <p>REGISTRATION NUMBER</p> <p>August 3, 2001</p> <p>DATE</p> </div> </div>				CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE			Total claims	- 20 =	0	x \$18.00		\$0.00	Independent claims	- 3 =	0	x \$80.00		\$0.00	Multiple Dependent Claims (check if applicable). <input type="checkbox"/>					\$0.00	TOTAL OF ABOVE CALCULATIONS =					\$860.00	<input type="checkbox"/> Applicant claims small entity status. (See 37 CFR 1.27). 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UNITED STATES PATENT AND TRADEMARK OFFICE

Re: Application of: Guido DEDENBACH et al.
Serial No.: To Be Assigned
International
Application No.: PCT/EP00/00809
Filed: Herewith
For: CIRCUIT BREAKER AND METHOD
FOR PRODUCING SAME

BOX PCT
Asst. Commissioner for Patents
Washington, D.C. 20231

August 3, 2001

PRELIMINARY AMENDMENT

Sir:

Applicants request that the following Amendments be made in the above-identified matter prior to examination thereof:

IN THE SPECIFICATION:

Before paragraph [0001], please change the heading "Field of the Invention" to --RELATED TECHNOLOGY--.

Please amend paragraph [0001] as follows:

[0001] The present invention relates to a circuit breaker having an interrupter chamber housing composed of plastic and an interrupter arranged in the interrupter chamber housing and having a busbar disposed inside an outside wall of the interrupter housing.

Before paragraph [0002], please delete the heading "Related Art".

Please amend paragraph [0002] as follows:

[0002] European Patent Document EP 0 560 696 B1 describes a circuit breaker featuring a rotary double-break interrupter, the interrupter chamber housing being composed of two housing modules. The interrupter includes two stationary contact members which are each connected to corresponding connecting terminals via loop-shaped busbars, and a two-arm contact member which is rotatable about an axis and which interconnects the two stationary contacts in its closed

position. For mounting the stationary contact members in the interrupter chamber housing in this circuit breaker, these stationary contact members are inserted together with the busbars into corresponding receptacles of the interrupter chamber housing which are intended for this. In this circuit breaker, it is disadvantageous, inter alia, that the heat generated during the normal use of the busbars is transferred to the interrupter chamber housing relatively slowly because the air surrounding the busbar is a very poor heat conductor. Besides, the busbars which are inserted into the receptacles of the interrupter chamber housing require an additional fixation to guarantee a sufficient strength in the region of the connecting terminals.

Before paragraph [0003], please change the heading "Summary of the Invention" to --SUMMARY OF THE INVENTION--.

Please amend paragraph [0003] as follows:

[0003] An object of the present invention is to specify a circuit breaker of the type mentioned at the outset in which the heat generated by the busbars is readily dissipated into the interrupter chamber housing more rapidly than in known comparable circuit breakers. Moreover, an intention is to provide a method for manufacturing a circuit breaker of that kind.

Please delete paragraph [0004].

After paragraph [0004], please insert paragraph [0004.1] as follows:

--[0004.1] The present invention provides a circuit breaker having an interrupter chamber housing composed of plastic and an interrupter which is arranged in the interrupter chamber housing and which includes at least one stationary contact member which is connected to a corresponding connecting terminal via a busbar, as well as a pivoting or sliding contact member which, in its closed position, can be connected to the stationary contact member. The busbar is arranged inside the outside wall of the interrupter chamber housing, and connected thereto over a large surface in a positive locking and/or force-locking manner. The busbar is injection-molded around with the plastic which forms the outside walls of the interrupter chamber housing. The present invention further provides a method for manufacturing such a circuit breaker wherein the respective busbar and, possibly, a blowout magnet allocated to the busbar, are brought into a mold for manufacturing the interrupter chamber housing as inserts. The manufacture of the interrupter chamber housing is then carried out by injection molding.--

Please amend paragraph [0005] as follows:

[0005] According to the present invention, the conductors are not inserted in corresponding receptacles and fixated using additional means subsequent to the manufacture of the interrupter chamber housing as in the known circuit breakers but, instead, are brought into the outside walls of the interrupter chamber housing already during its manufacture and connected thereto over a large surface (that is virtually over the entire surface) in a positive locking and/or force-locking manner. Such a connection between the busbars and the outside walls of the interrupter chamber housing can be effected by manufacturing the respective interrupter chamber housing by injection molding, the busbars being inserted into the corresponding mold prior to injection molding.

Please amend paragraph [0008] as follows:

[0008] A further advantage of the busbars, which are imbedded, such as by being injection-molded around, consists in the mechanically highly firm fixation of the rails in the housing, a later change of the positions of the contacts being ruled out.

Before paragraph [0009], please change the heading "Brief Description of the Drawings" to --BRIEF DESCRIPTION OF THE DRAWING--.

Please delete paragraph [0009].

After paragraph [0009], please insert paragraph [0009.1] as follows:

--[0009.1] The present invention is elaborated on below based on exemplary embodiments with reference to the drawing, in which:

Fig. 1 shows a longitudinal section through an interrupter chamber housing according to the present invention.--.

Before paragraph [0010], please change the heading "Best Ways of Implementing the Present Invention" to --DETAILED DESCRIPTION--.

Please amend paragraph [0011] as follows:

[0011] According to the present invention, both busbars 8, 9 and blowout magnets 14, 15 are at least partially imbedded in outside walls 16, 17 of housing modules 2, 3 of interrupter chamber housing 1, and firmly connected to these outside walls over a large surface on the peripheral side so that a good heat transfer takes place from busbars 8, 9 to the plastic of outside walls 16, 17 which surrounds the rails. In this context, a high heat transfer from busbars 8, 9 to outside walls 16, 17 of housing modules 2, 3 ensues, in particular, if the housing modules 2, 3 are

manufactured by injection molding, and busbars 8, 9 and blowout magnets 14, 15 are brought into the corresponding molds for manufacturing housing modules 2, 3 as inserts prior to injection molding.

Page 5, first line please change "What is claimed is" to --WHAT IS CLAIMED IS--.

IN THE CLAIMS:

Please cancel claims 1-7 as presented in the underlying International Application No. PCT/EP00/00809 as well as the revised claims 1-6 annexed to the International Preliminary Examination Report (a translation of which claims is submitted herewith), and add new claims 8-17 as follows:

- 8. (new) A circuit breaker comprising:
- an interrupter chamber housing having an outside wall of a plastic material;
 - an interrupter including a stationary contact member disposed in the interrupter chamber housing and a moveable contact member moveably connectable to the stationary contact member;
 - a connecting terminal corresponding to the stationary contact member; and
 - a busbar imbedded into the outside wall and in contact with the outside wall over a large surface of the busbar, the busbar providing a connection between the stationary contact member and the corresponding connecting terminal.
9. (new) The circuit breaker as recited in claim 8 wherein the busbar is imbedded into the outside wall by an injection molding process using the plastic material.
10. (new) The circuit breaker as recited in claim 8 wherein the moveable contact member is at least one of a pivoting and a sliding contact member.
11. (new) The circuit breaker as recited in claim 8 wherein the busbar is connected to the outside wall in at least one of a positive locking and force-locking manner.

12. (new) The circuit breaker as recited in claim 8 wherein the busbar is loop-shaped.

13. (new) The circuit breaker as recited in claim 12 further comprising a blowout magnet imbedded in the outside wall between a first leg and a second leg of the loop-shaped busbar.

14. (new) The circuit breaker as recited in claim 8 further comprising a second connecting terminal and a second busbar wherein the interrupter is a rotary double-break interrupter that includes a second stationary contact member connected to the second terminal using the second busbar.

15. (new) The circuit breaker as recited in claim 14 wherein the interrupter housing includes two housing modules, each housing module accommodating one of the stationary contact member and second stationary contact member.

16. (new) A method for manufacturing a circuit breaker having an interrupter chamber housing including a plastic material and a busbar for connecting a stationary contact member and a connecting terminal, the method comprising:

selecting a mold;

positioning the busbar in the mold;

injecting the plastic material into the mold so as to surround a large surface area of the busbar.

17. (new) The method as recited in claim 16, further comprising positioning a blowout magnet in the mold before the injecting of the plastic material.--.

IN THE ABSTRACT:

Please replace the abstract of record with the following new abstract:

-- A circuit-breaker including a an interrupter chamber housing that includes a plastic material and houses an interrupter. The interrupter includes at least one stationary contact member, which, via a busbar is connected to a corresponding connecting terminal and a moveable contact

member that is moveably connectable to the stationary contact member. To ensure that heat generated by the busbar is more rapidly released into the switch compartment housing the busbar is imbedded in an outer wall of the interrupter chamber housing and in contact with the housing by a form fit or a force fit.--.


REMARKS

It is respectfully submitted that no new matter has been added.

Applicants believe that no fees are due as a result of this amendment. In the event of a fee discrepancy, please charge our Deposit Account No. 50-0552.

Respectfully submitted,

DAVIDSON, DAVIDSON & KARPEL, LLC

By: 

William C. Gehris
Reg. No. 38,156


Davidson, Davidson & Kappel, LLC
485 Seventh Avenue - 14th Floor
New York, New York 10018
(212) 736-1940

"Express Mail" mailing label no EL 825523226 US

Date of deposit August 3, 2001

I hereby certify that this correspondence and/or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above in an envelope addressed to "Commissioner of Patents and Trademarks, Washington, DC 20231"

DAVIDSON, DAVIDSON & KAPPEL, LLC

BY: 
Samuel Gomez

Application of: Guido DEDENBACH et al.

International Application No. PCT/EP00/00809

Filed Herewith

VERSION OF SPECIFICATION AND CLAIMS AMENDMENTS
WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

Page 1, before paragraph [0001]: --RELATED TECHNOLOGY-- [Field of the Invention]

Page 1, paragraph [0001]:

[0001] The present invention relates to a circuit breaker having an interrupter chamber housing composed of plastic and an interrupter arranged in the interrupter chamber housing and having a busbar disposed inside an outside wall of the interrupter housing [according to the features of the first part of Claim 1].

Page 1, paragraph [0002]:

[0002] [A circuit breaker of this kind is known, for example, from] European Patent Document EP 0 560 696 B1 [which relates to] describes a circuit breaker featuring a rotary double-break interrupter, the interrupter chamber housing being composed of two housing modules. The interrupter includes two stationary contact members which are each connected to corresponding connecting terminals via loop-shaped busbars, and a two-arm contact member which is rotatable about an axis and which interconnects the two stationary contacts in its closed position. For mounting the stationary contact members in the interrupter chamber housing in [the known] this circuit breaker, these stationary contact members are inserted together with the busbars into corresponding receptacles of the interrupter chamber housing which are intended for this. In this [known] circuit breaker, it is disadvantageous, inter alia, that the heat generated during the normal use of the busbars is transferred to the interrupter chamber housing relatively slowly because the air surrounding the busbar is a very poor heat conductor. Besides, the busbars which

are inserted into the receptacles of the interrupter chamber housing require an additional fixation to guarantee a sufficient strength in the region of the connecting terminals.

Page 1, before paragraph [0003]: --SUMMARY OF THE INVENTION-- [Summary of the Invention]

Page 1, paragraph [0003]:

[0003] [The] An object of the present invention is to specify a circuit breaker of the type mentioned at the outset in which the heat generated by the busbars is readily dissipated into the interrupter chamber housing more rapidly than in known comparable circuit breakers. Moreover, [the] an intention is to [disclose] provide a method for manufacturing a circuit breaker of that kind.

Page 2, paragraph [0005]:

[0005] [The present invention is essentially based on the idea that,] According to the present invention, the conductors are not inserted in corresponding receptacles and fixated using additional means subsequent to the manufacture of the interrupter chamber housing as in the known circuit breakers but, instead, [that they] are brought into the outside walls of the interrupter chamber housing already during its manufacture and connected thereto over a large surface (that is virtually over the entire surface) in a positive locking and/or force-locking manner. Such a connection between the busbars and the outside walls of the interrupter chamber housing can be effected by manufacturing the respective interrupter chamber housing by injection molding, the busbars being inserted into the corresponding mold prior to injection molding.

Page 3, paragraph [0008]:

[0008] A further advantage of the busbars, which are imbedded, such as by being injection-molded around, consists in the mechanically highly firm fixation of the rails in the housing, a later change of the positions of the contacts being ruled out.

Page 3, before paragraph [0009]: -- BRIEF DESCRIPTION OF THE DRAWINGS-- [Brief Description of the Drawings]

Page 3, before paragraph [0010]: --DETAILED DESCRIPTION--[Best Ways of Implementing the Present Invention]

Page 3, paragraph [0011]:

[0011] According to the present invention, both busbars 8, 9 and blowout magnets 14, 15 are [arranged] at least partially imbedded in outside walls 16, 17 of housing modules 2, 3 of interrupter chamber housing 1, and firmly connected to these outside walls over a large surface on the peripheral side so that a good heat transfer takes place from busbars 8, 9 to the plastic of outside walls 16, 17 which surrounds the rails. In this context, a high heat transfer from busbars 8, 9 to outside walls 16, 17 of housing modules 2, 3 ensues, in particular, if the housing modules 2, 3 are manufactured by injection molding, and busbars 8, 9 and blowout magnets 14, 15 are brought into the corresponding molds for manufacturing housing modules 2, 3 as inserts prior to injection molding.

Page 5, first line: --WHAT IS CLAIMED IS--[What is claimed is]

1/PRT.

09/890685

JC05 Rec'd PCT/PTO

03 AUG 2001
521.1008

CIRCUIT BREAKER AND METHOD FOR PRODUCING SAME

Field of the Invention

[0001] The present invention relates to a circuit breaker having an interrupter chamber housing composed of plastic and an interrupter arranged in the interrupter chamber housing according to the features of the first part of Claim 1.

Related Art

[0002] A circuit breaker of this kind is known, for example, from European Patent Document EP 0 560 696 B1 which relates to a circuit breaker featuring a rotary double-break interrupter, the interrupter chamber housing being composed of two housing modules. The interrupter includes two stationary contact members which are each connected to corresponding connecting terminals via loop-shaped busbars, and a two-arm contact member which is rotatable about an axis and which interconnects the two stationary contacts in its closed position. For mounting the stationary contact members in the interrupter chamber housing in the known circuit breaker, these stationary contact members are inserted together with the busbars into corresponding receptacles of the interrupter chamber housing which are intended for this. In this known circuit breaker, it is disadvantageous, inter alia, that the heat generated during the normal use of the busbars is transferred to the interrupter chamber housing relatively slowly because the air surrounding the busbar is a very poor heat conductor. Besides, the busbars which are inserted into the receptacles of the interrupter chamber housing require an additional fixation to guarantee a sufficient strength in the region of the connecting terminals.

Summary of the Invention

[0003] The object of the present invention is to specify a circuit breaker of the type mentioned at the outset in which the heat generated by the busbars is readily dissipated into the interrupter chamber housing more rapidly than in known comparable circuit breakers. Moreover, the intention is to disclose a method for manufacturing a circuit breaker of that

09/890685

kind.

[0004] This objective is achieved with respect to the circuit breaker by the features of Claim 1 and with respect to the method for its manufacture by the features of Claim 6. Further, particularly advantageous refinements of the present invention are disclosed in the subclaims.

[0005] The present invention is essentially based on the idea that, the conductors are not inserted in corresponding receptacles and fixated using additional means subsequent to the manufacture of the interrupter chamber housing as in the known circuit breakers but that they are brought into the outside walls of the interrupter chamber housing already during its manufacture and connected thereto over a large surface (that is virtually over the entire surface) in a positive locking and/or force-locking manner. Such a connection between the busbars and the outside walls of the interrupter chamber housing can be effected by manufacturing the respective interrupter chamber housing by injection molding, the busbars being inserted into the corresponding mold prior to injection molding.

[0006] In the case of loop-shaped busbars having blowout magnets arranged between the legs of the busbars (cf., for example, European Patent Document EP 0 560 696 B1 mentioned at the outset), the blowout magnets can also be fixated in the corresponding mold together with the busbars and subsequently molded into the side walls of the interrupter chamber housing during its manufacture. In this manner, both a stable fixation of the respective blowout magnet within the interrupter chamber housing and the required insulation of the respective blowout magnet against the corresponding busbar is achieved in a simple manner.

[0007] The circuit breaker according to the present invention not only has the advantage that a good heat transfer takes place from the heated busbars into the interrupter chamber housing surrounding them but also guarantees a high strength of the busbars in the region of the connecting terminals and in the region of the contacts which are subject to high dynamic loads.

[0008] A further advantage of the busbars which are injection-molded around consists in the mechanically highly firm fixation of the busbars in the housing, a later change of the positions of the contacts being ruled out.

Brief Description of the Drawings

[0009] Further details and advantages of the present invention ensue from the following exemplary embodiment which will be explained with reference to Figure 1 which shows the longitudinal section through an interrupter chamber housing according to the present invention.

Best Way of Implementing the Invention

[0010] In Fig. 1, reference numeral 1 denotes the interrupter chamber housing of a circuit breaker featuring a rotary double-break interrupter, the interrupter chamber housing being composed of two identical housing modules 2 and 3 made of plastic. Each of the two housing modules 2, 3 includes a stationary contact member 4, 5 which can be connected via a pivoting contact member which is not shown for reasons of clarity. Arranged between stationary contact members 4, 5 and connecting terminals 6, 7 provided outside of the interrupter chamber housing is in each case a loop-shaped busbar 8, 9, a blowout magnet 14, 15 being arranged between the two legs 10, 11 and 12, 13 of busbars 8, 9, respectively.

[0011] According to the present invention, both busbars 8, 9 and blowout magnets 14, 15 are arranged in outside walls 16, 17 of housing modules 2, 3 of interrupter chamber housing 1, and firmly connected to these outside walls over a large surface on the peripheral side so that a good heat transfer takes place from busbars 8, 9 to the plastic of outside walls 16, 17 which surrounds the busbars. In this context, a high heat transfer from busbars 8, 9 to outside walls 16, 17 of housing modules 2, 3 ensues, in particular, if the housing modules 2, 3 are manufactured by injection molding, and busbars 8, 9 and blowout magnets 14, 15 are brought into the corresponding molds for manufacturing housing modules 2, 3 as inserts prior to

injection molding.

[0012] The present invention is of course not limited to the above described exemplary embodiment. Thus, for example, the circuit breaker does not necessarily have to be one featuring a rotary double-break interrupter. Rather the interrupter can also be equipped with a single-arm pivoting contact member (single-break interrupter) or with a translatorily movable contact member.

[0013] Moreover, it is conceivable for the interrupter chamber housing to be manufactured, for example, by transfer molding or by casting of reaction resins in lieu of injection molding. In manufacturing methods of that kind, the busbars of the circuit breaker and, possibly, the blowout magnets are also brought into the corresponding mold for manufacturing the interrupter chamber housing or its modules prior to the transfer molding or casting process to ensure an "intimate" connection over a large surface between the busbars and the plastic surrounding them.

What is claimed is:

1. A circuit breaker having an interrupter chamber housing (1) composed of plastic and an interrupter which is arranged in the interrupter chamber housing (1) and which includes at least one stationary contact member (4,5) which is connected to a corresponding connecting terminal (6,7) via a busbar (8,9), as well as a pivoting or sliding contact member which, in its closed position, can be connected to the stationary contact member (4,5),
wherein the busbar (8,9) is arranged inside the outside wall (16, 17) of the interrupter chamber housing (1), and connected thereto over a large surface in a positive locking and/or force-locking manner.
2. The circuit breaker as recited in Claim 1,
wherein the busbar (8, 9) is injection-molded around with the plastic which forms the outside walls (16, 17) of the interrupter chamber housing (1).
3. The circuit breaker as recited in Claim 1 or 2,
wherein the busbar (8, 9) is loop-shaped.
4. The circuit breaker as recited in Claim 3,
wherein a blowout magnet (14, 15) is arranged between the two legs (10-13) of the busbars (8, 9).
5. The circuit breaker as recited in one of the Claims 1 through 4,
wherein the interrupter is a rotary double-break interrupter having two stationary contact members (4, 5) which are each connected to a corresponding connecting terminal (6, 7) via a busbar (8, 9).
6. The circuit breaker as recited in Claim 5,
wherein the interrupter chamber housing (1) is composed of two housing modules (2,3) having an identical design, each of the housing modules (2,3) accommodating a

Abstract

The invention relates to a circuit-breaker comprising a switch compartment housing (1) which is made of a plastic material and houses an interrupter. Said interrupter comprises at least one fixed switching element (4, 5) which via a busbar (8, 9) is connected to a corresponding terminal (6, 7), and a pivoting or sliding switching element which in its closed position can be connected to the fixed switching element (4, 5). To ensure that the heat generated by the busbar (8, 9) is readily released into the switch compartment housing (1) more rapidly than with known comparable circuit breakers, the invention provides for the busbar (8, 9) to be positioned in the outer wall (16, 17) of the switch compartment housing (1) and to be connected with same over a large area by a form fit and/or force fit.

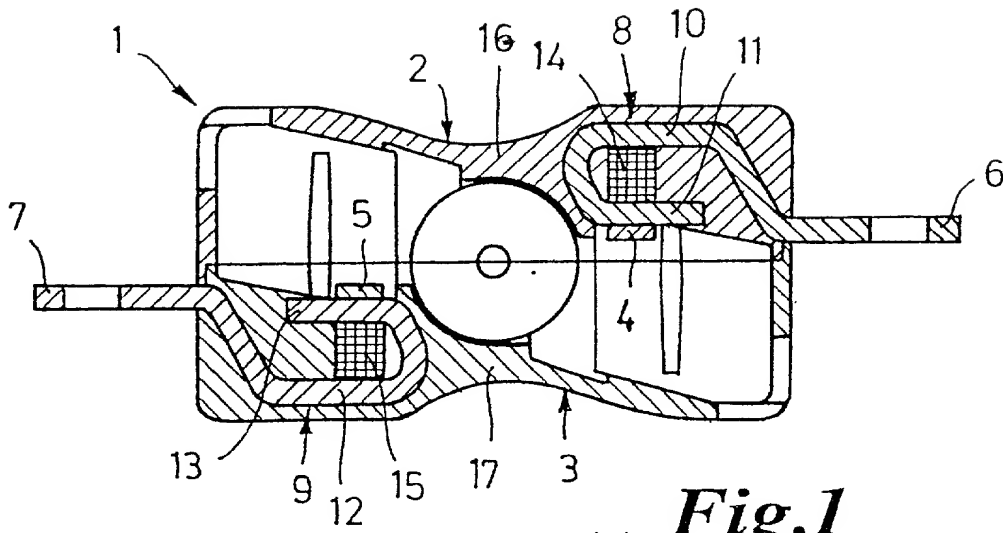
What is claimed is:

1. A circuit breaker having an interrupter chamber housing (1) composed of plastic and an interrupter which is arranged in the interrupter chamber housing (1) and which includes at least one stationary contact member (4,5) which is connected to a corresponding connecting terminal (6,7) via a busbar (8,9), as well as a pivoting or sliding contact member which, in its closed position, can be connected to the stationary contact member (4,5),
wherein the busbar (8,9) is arranged inside the outside wall (16, 17) of the interrupter chamber housing (1), and connected thereto over a large surface in a positive locking and/or force-locking manner; and
the busbar (8,9) is injection-molded around with the plastic which forms the outside walls (16, 17) of the interrupter chamber housing (1).
2. The circuit breaker as recited in Claim 1,
wherein the busbar (8,9) is loop-shaped.
3. The circuit breaker as recited in Claim 2,
wherein a blowout magnet (14,15) which is also injection-molded around with the plastic which forms the outside walls (16, 17) of the interrupter chamber housing (1) is arranged between the two legs (10-13) of the busbars (8, 9).
4. The circuit breaker as recited in Claim 1,
wherein the interrupter is a rotary double-break interrupter having two stationary contact members (4,5) which are each connected to a corresponding connecting terminal (6,7) via a busbar (8,9).
5. The circuit breaker as recited in Claim 4,
wherein the interrupter chamber housing (1) is composed of two housing modules (2,3) having an identical design, each of the housing modules (2,3) accommodating a stationary contact member (4,5) which is connected to a connecting terminal (6, 7) via

a corresponding busbar (8, 9).

6. A method for manufacturing the circuit breaker according to Claim 1, wherein the respective busbar (8, 9) and, possibly, a blowout magnet (14, 15) allocated to the busbar (8, 9), are brought into a mold for manufacturing the interrupter chamber housing (1) as inserts; and the manufacture of the interrupter chamber housing (1) is then carried out by injection molding.

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*Fig.1*

DECLARATION AND POWER OF ATTORNEY

Docket No.: 521.1008

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter that is claimed and for which a patent is sought on the invention entitled: CIRCUIT BREAKER AND METHOD FOR PRODUCING SAME
the specification of which (check one)

☐ is attached hereto

☒ was filed on 1 February 2000 as International Application Serial No. PCT EP/00/00809 and was amended on (if applicable).

☐ I hereby authorize and request our attorneys, Davidson, Davidson & Kappel, LLC of 485 Seventh Avenue, New York, New York 10018 to insert here in parentheses (application number _____, filed _____) the filing date and application number of said application when known.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose all information that is known to me to be material to the patentability of this application as defined in Title 37, Code of Federal Regulations, §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign and/or provisional application(s) for patent or inventor's certificate listed below and have also identified below any foreign and/or provisional application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

PRIOR APPLICATION(S)

DE 199 04 355.8	Germany	4. February 1999	Priority claimed <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Number	Country	Day/Month/Year Filed	
			Priority claimed <input type="checkbox"/> Yes <input type="checkbox"/> No
Number	Country	Day/Month/Year Filed	

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

Application Serial Number	Day/Month/Year Filed	Status
Application Serial Number	Day/Month/Year Filed	Status

And I hereby appoint Clifford M. Davidson, Reg. No. 32,728, Leslye B. Davidson, Reg. No. 38,854, Cary S. Kappel, Reg. No. 36,561, William C. Gehris, Reg. No. 38,156, Morey B. Wildes, Reg. No. 36,968, Robert J. Paradiso, Reg. No. 41,240, Erik R. Swanson, Reg. No. 40,833, Thomas P. Canty, Reg. No. 44,586, and all other registered attorneys and agents at Davidson, Davidson & Kappel, LLC, U.S. Patent and Trademark Office Customer Number 23280, my attorneys, with full power of substitution and revocation, to prosecute this application and to transact all business in the U.S. Patent and Trademark Office connected therewith; correspondence address: DAVIDSON, DAVIDSON & KAPPEL, LLC, 485 Seventh Avenue, 14th Floor, New York, New York 10018; Telephone: (212) 736-1940; Fax: (212) 736-2427.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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